ASSIGNMENT 1

Textbook Assignment: "Theory of Light and Optical Principles." Pages 1-1 through 1-37.

Learning Objective: Identify principles and characteristics of light.

1-1. In what range of the electromagnetic spectrum does light exist?

1. lnm to 100,000nm
2. 10nm to 10,000nm
3. 100nm to 1,000nm
4. 400nm to 700nm

1-2. What theory was published by Max Planck to explain X ray, radiation, and photoelectricity?

1. Wave motion
2. Quantum
3. Raster
4. Electromagnetic

1-3. What theory explains reflection, refraction, diffraction, and polarization?

1. Wave motion
2. Quantum
3. Photo optics
4. Electromagnetic

1-4. A nanometer is equal to what number of millimeters?

1. 1/10
2. 1/100
3. 1/1,000
4. 1/1,000,000

1-5. The speed of light is always constant.

1. True
2. False

1-6. The distance from the crest of one wave to the crest of the next wave of light describes what term?

1. Frequency
2. Speed
3. Wavelength
4. Distribution

1-7. What color of light is made up of an even mixture of all the visible wavelengths?

1. White
2. Black
3. Blue
4. Green

1-8. The spectral energy of a light source is represented by

1. speed
2. frequency
3. wavelength
4. color temperature

1-9. The color temperature of red light is less than the color temperature of blue light.

1. True
2. False

1-10. What scale is used to measure the color temperature of light?

1. Fahrenheit
2. Celsius
3. Kelvin
4. Chromaticity

1-11. Color hue is defined as what property of color?

1. Brightness
2. Purity
3. Saturation
4. Color

1-12. The terms dull, bright, vivid, and brilliant are used to describe what color characteristic?

1. Hue
2. Brightness
3. Saturation
4. Purity

Learning Objective: Identify ways in which light reacts with various mediums.

1-13. When light waves encounter an object, which of the following actions may take place?

1. Reflection
2. Absorption
3. Transmission
4. Each of the above

1-14. Specular light strikes a smooth surface at 60 degrees. At what angle is the light reflected?

1. 30 degrees
2. 60 degrees
3. 90 degrees
4. 120 degrees

1-15. Which of the following descriptors best defines an object that is opaque?

1. Very hard
2. Highly reflective
3. Light stopping
4. Each of the above

1-16. A change in direction that occurs when light passes from one transparent medium into another is known by what term?

1. Refraction
2. Reflection
3. Diffraction
4. Dispersion

1-17. What characteristic of light allows a lens to form an image?

1. Reflection
2. Diffraction
3. Refraction
4. Dispersion

1-18. Of the following wavelengths, which one has its speed reduced the most when it enters a medium of higher density?

1. Red
2. Yellow
3. Green
4. Blue

1-19. What term describes the ability of a prism to break up white light into its component colors?

1. Refraction
2. Diffraction
3. Dispersion
4. Polarization

1-20. A light ray is bent as it passes very close to an opaque object. What term is used to describe this event?

1. Dispersion
2. Refraction
3. Polarization
4. Diffraction

1-21. When the motion a light wave is in one direction only, the light is

1. parallel
2. polarized
3. planed
4. directionless

1-22. What type of light is seen as glare?

1. Plane polarized
2. Diffused
3. Tungsten
4. Fluorescent

Learning Objective: Recognize various sources of light and the differences between them.

1-23. What color of light is scattered the most by the atmosphere?

1. Red
2. Green
3. Yellow
4. Blue

1-24. What is the approximate color temperature of overhead sunlight on a clear day?

1. 2000 K
2. 3200 K
3. 5400 K
4. 60000 K

1-25. You have exposed daylight balanced color slide film under fluorescent light without a filter. What color cast do the finished slides have?

1. Blue
2. Green
3. Yellow
4. Red

1-26. What is the main purpose of a lamp reflector?

1. To increase the amount of light emitted by a lamp
2. To diffuse light
3. To polarize light
4. To redirect light

1-27. Most electronic-flash units are designed to be most efficient when they are at what distance from the subject?

1. 3 to 10 feet
2. 6 to 12 feet
3. 10 to 18 feet
4. 12 to 36 feet

Learning Objective: Identify basic characteristics of photographic lenses.

1-28. The inherent errors of a lens are known by what term?

1. Faults
2. Defects
3. Aberrations
4. Parallax

1-29. The inability of a lens to focus sharply both horizontal and vertical lines on the same plane is what lens aberration?

1. Astigmatism
2. Coma
3. Spherical
4. Chromatic

1-30. The distance from the optical center of the lens to the film plane is 150mm. The image on the film is in sharp focus. The lens is focused on an object at infinity or 640 feet away. What is the focal length of this lens?

1. 50mm
2. 85mm
3. 135mn
4. 150mm

1-31. The focal length can be changed in what type of lens?

1. Mirror
2. Zoom
3. Macro
4. Anamorphic

1-32. What factor determines the normal focal-length lens for a camera?

1. Film size
2. Shutter type
3. Camera size
4. Lens-to-film distance

1-33. Providing the camera-to-subject distance remains unchanged, which of the following focal-length lenses provides the greatest subject area?

1. 200mm
2. 100mm
3. 50mm
4. 25mm

1-34. Which of the following focal-length lenses used at the same lens-to-film distance will produce the largest image of the subject?

1. 135mm
2. 80mm
3. 50mm
4. 25mm

1-35. The angle of field for a normal lens is within a range of how many degrees?

1. 25° to 35°
2. 45° to 55°
3. 75° to 85°
4. 95° to 105°

1-36. What type of lens has an angle of view greater than 55 degrees?

1. Telephoto
2. Mirror
3. Wide angle
4. Long-focal length

1-37. What is the final result when an image is recorded with a lens that has a large diaphragm opening?

1. Moving objects appear sharp
2. All objects within the scene appear sharp
3. Angle of view is increased
4. Only the object the lens is focused on appears sharp

1-38. Photographic perspective depends on the focal length of the lens.

1. True
2. False

1-39. The lens you are using is focused on infinity and set at f/8. The size of the aperture is 1/2 inch. What is the focal length, in inches?

1. 1
2. 2
3. 8
4. 4

Learning Objective: Recognize the function and the effects of the aperture of a lens.

1-40. The lens you are using is set at f/16 and is focused less than infinity. What is the relative aperture of the lens?

1. f/8
2. f/11
3. f/16
4. f/22

1-41. What is the relative aperture of a 6-inch lens with an effective aperture of 1.5 inches?

1. f/4
2. f/5.6
3. f/8
4. f/11

1-42. Three lenses of different focal lengths are used at the same f/stop to photograph the same subject. What lens, if any, produces the brightest image on the film plane?

1. 200mm
2. 50mm
3. 28mm
4. None

1-43. Which of the following terms describes the device within a lens that controls the amount of light passed by the lens to the film plane?

1. Concentricizer
2. Diaphragm
3. Adjuster
4. Obstructor

1-44. What term is used to describe the largest aperture of a lens?

1. Refraction index
2. Closed-down aperture
3. Lens speed
4. Optimum aperture

1-45. Which of the following f/stops represents the largest aperture?

1. f/5.6
2. f/8
3. f/22
4. f/32

1-46. You have changed the lens setting from f/5.6 to f/16. What term describes the action you have taken?

1. Stopping down
2. Opening up
3. Racking out
4. Sliding back

1-47. You have changed the f/stop setting from f/16 to f/8. What amount of light is admitted to the film plane?

1. One half
2. Two times
3. One quarter
4. Four times

1-48. A lens set to f/8 produced a correct exposure in 1 second. When you set the lens at f/4, what is the correct exposure time, in seconds?

1. 1
2. 2
3. 1/2
4. 1/4

1-49. Of the following f/stops, which one is not a standard, full f/stop?

1. f/l
2. f/2.5
3. f/5.6
4. f/45

Learning Objective: Identify factors that affect the means in which a lens focuses an image.

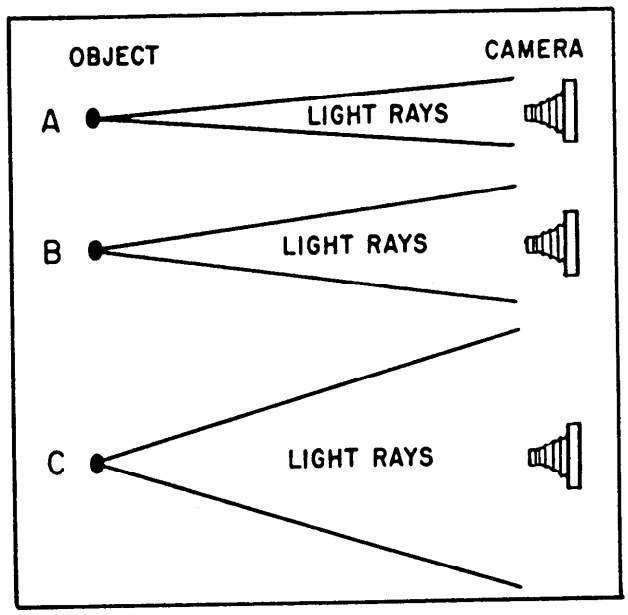

Figure 1A

IN ANSWERING QUESTION 1-50, REFER TO FIGURE 1A.

1-50. What object is represented as being the greatest distance from the camera?

1. A
2. B
3. C

1-51. The principal focal plane is located a total of how many inches behind a 3-inch focal-length lens?

1. 1.5
2. 6
3. 3
4. 4

1-52. As an object moves closer to the lens, what distance, if any, must the film plane to the lens change in order to keep the image in sharp focus?

1. It must be increased
2. It must be decreased
3. None

1-53. What distance is required between the lens and the focal plane so the image formed by a 2-inch focal-length lens is the same size as the subject?

1. 1 inch
2. 2 inches
3. 1.4 inches
4. 4 inches

1-54. The distance the focal plane can be moved forward or backward from the plane of sharp focus and still record an acceptably sharp image is known by what term?

1. Depth of field
2. Circle of confusion
3. Depth of focus
4. Hyperfocal distance

1-55. What term describes the distance from the lens beyond which all objects are rendered in acceptably sharp focus when the lens is set at infinity?

1. Hyperfocal distance
2. Depth of field
3. Depth of focus
4. Near distance

1-56. What is the hyperfocal distance of a 6-inch lens set at f/11 when the permissible circle of confusion is 0.006 inches?

1. 2.38 feet
2. 36.72 feet
3. 545.45 feet
4. 3361.11 feet

1-57. Your lens is set at f/11, the hyperfocal distance is 71 feet, and your subject is 112 feet from the camera. You should focus at what distance for maximum depth of field?

1. 35.5 feet
2. 56.0 feet
3. 71.0 feet
4. 112.0 feet

1-58. Of the following lenses, which one provides the greatest depth of field when set at f/5.6 and focused on an object 6 feet from the lens?

1. 35mm
2. 50mm
3. 80mm
4. 135mm

1-59. Which of the following factors affects depth of field?

1. Lens focal length
2. Lens f/stop
3. Camera-to-subject distance
4. All of the above

1-60. You are using a lens focused on the hyperfocal distance which is 50 feet. What is the approximate depth-of-field range?

1. 25 feet to 75 feet only
2. 25 feet to infinity
3. 50 feet to infinity only
4. 75 feet to infinity only

1-61. What is the depth of field of a 50mm lens set at f/8 with a permissible circle of confusion of 0.002 inches when it is focused on an object 20 feet from the lens?

1. 10.0 feet to 20.0 feet
2. 15.7 feet to 23.4 feet
3. 18.6 feet to 21.7 feet only
4. 20.0 feet to 23.8 feet only

Learning Objective: Determine the relationship between the subject/image size.

1-62. A document is 1-inch square. You must photograph it to produce a 4-inch-square image on the film. Using a 6-inch lens, what image focal distance is required?

1. 10 inches
2. 12 inches
3. 24 inches
4. 30 inches

1-63. The size of the image formed by a lens depends on which of the following factors?

1. The size of the subject
2. The lens-to-subject distance
3. The lens focal length
4. All of the above

1-64. A 10-inch focal-length lens is used to photograph an object 8 feet high from a distance of 28 feet. What image size is on the film plane?

1. 1.25 inches
2. 2.50 inches
3. 2.85 inches
4. 5.70 inches

1-65. You are assigned to photograph an object 10 feet wide using a 4x5-inch camera with a 7-inch lens. You must position your camera what distance from the object to produce a 3-inch image?

1. 1.40 feet
2. 11.65 feet
3. 23.30 feet
4. 46.60 feet

1-66. Using a 35mm camera with a 50mm lens, you have photographed a subject. However, the shooting-crew supervisor informs you that a 4x5-inch negative is required. You cannot change your shooting position. What focal-length lens should you use on the 4x5 camera to obtain approximately the same coverage produced with the 35mm camera?

1. 360mm
2. 210mm
3. 90mm
4. 65mm

Learning Objective: Identify various types of lenses and their characteristics.

1-67. Which of the following are characteristics of a long-focal-length lens?

1. They have a reduced depth of field
2. They decrease the apparent distance between subjects on different planes
3. Both 1 and 2 above
4. They introduce image distortion

1-68. A wide-angle lens has which of the following characteristics?

1. Increased depth of field
2. Exaggerated linear perspective
3. Increased apparent distance between planes
4. All of the above

1-69. When photographing a building, you notice in the viewfinder that the sides of the building appear to be bending toward the center of the image area. What type of lens is on your camera?

1. Rectilinear
2. Wide angle
3. Normal
4. Telephoto

1-70. The distortion caused by wide-angle lenses actually changes perspective.

1. True
2. False

1-71. Which of the following lenses is very useful for taking pictures of extreme closeups shots?

1. Fisheye
2. Rectilinear
3. Telephoto
4. Macro

1-72. Of the following lenses, which one is best for taking informal portraits with a 35mm camera?

1. 100mm
2. 50mm
3. 35mm
4. 17mm

1-73. You are photographing a row of aircraft on the flight deck. Using a medium-format camera, you should use which of the following lenses to make the aircraft appear to be parked very close to each other?

1. 500mm
2. 150mm
3. 75mm
4. 40mm

1-74. Of the following characteristics, which one is NOT representative of a mirror lens?

1. Shorter physical size
2. Out-of-focus highlights that record as rings of light
3. Wide range of f/stops
4. Limited depth of field

1-75. What type of lens is used to change the image size without changing the lens-to-film distance?

1. Macro
2. Zoom
3. Mirror
4. Telephoto